Quick Start Guide

Installation, Operation, Commissioning and Maintenance

Minipack, PS System

DC Power Supply System

Integrated Applications

Power Supply System ~ Telecom

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ELTEK VALERE

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The *Smartpack* based Product Range

Eltek Valere's Smartpack based product range utilizes the *Smartpack* controller, and *Flatpack2* rectifiers, *Powerpack* rectifiers and *Minipack* rectifiers as building blocks for implementing effective DC power systems, suitable for a wide range of applications and power ratings.

Powerpack System

Flatpack2 System, Cabinetized Indoor and Outdoor Cabinets

Flatpack2 System, Integrated 4U and 1U Distributions

Minipack System, Integrated

Cabinetized systems are suitable for indoor or outdoor applications. In addition to the power system and the distribution unit, the cabinet may also contain battery banks, additional distribution and other dedicated equipment.

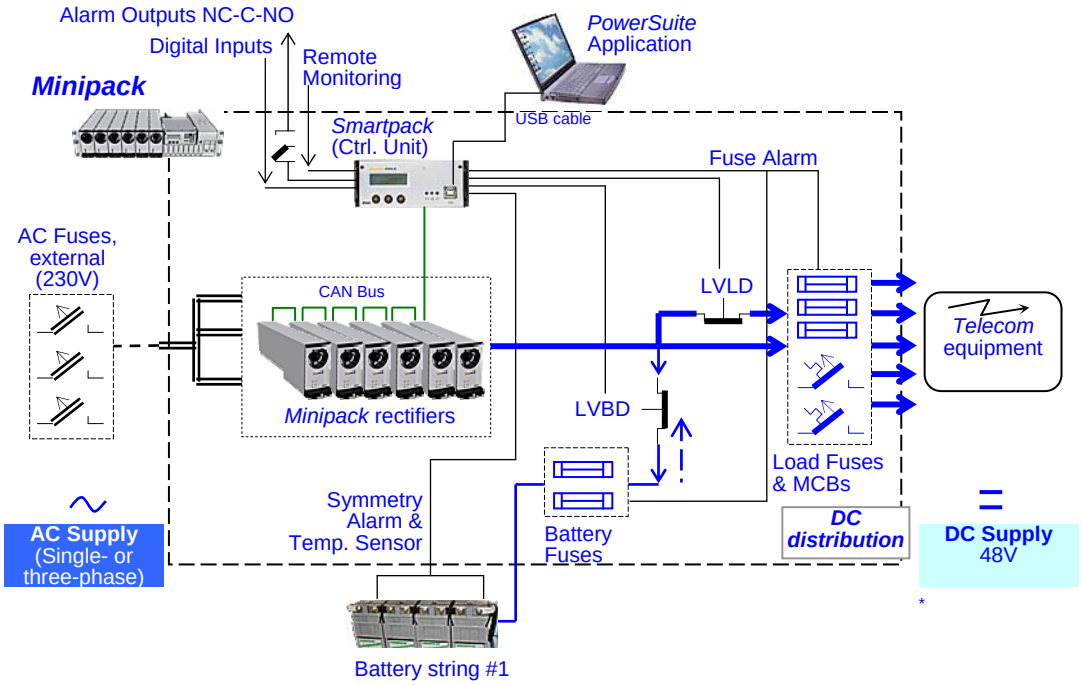
Integrated systems consist of the power system, which includes rectifiers and controller(s), and the distribution unit (1U or 4U high). Integrated systems are sold primarily for mounting in existing cabinets.

Powerpack systems are suitable for large Central Office power plants, and use three-phase rectifier modules.

Minipack systems are suitable as small, stand-alone battery chargers and DC power supplies.

Brief System Description — *Minipack*

The *Minipack PS* system is a compact and cost-effective DC power supply system, specifically developed for the telecom industry.



Example of a typical *Minipack PS* system for DC power supply of telecom equipment. The system is supplied from an external AC mains supply, and is delivered in one power shelf for integration in existing cabinets (integrated). An external battery bank is to be connected.

Installing *Smartpack* and Rectifier Modules

Device hazard

CAUTION: **Do not hand-carry** the controller by its handles. Cables and circuit boards are plugged to the controller's rear panel. **Open the handles before inserting** the controller into the power shelf.

Mounting or Removing *Smartpack* Controller

Mounting the *Smartpack* controller

1. **Open the handles** by
   inserting a screwdriver into the holes to release the spring mechanism
2. **Insert the module** fully into the power shelf, after plugging the cables to the rear panel
3. **Lock the handles** by
   pushing the handles up into their housings (locked position), so that the module is securely locked

Removing the *Smartpack* controller

1. **Open the handles** by
   inserting a screwdriver into the holes to release the spring mechanism
2. **Remove the module** by
   using both handles to pull the module loose gently; support from underneath; unplug the cables connected to the rear panel

Device hazard

CAUTION: The modules may be warm. **Remove the locking screw before inserting** them into the power shelf (hot-pluggable).

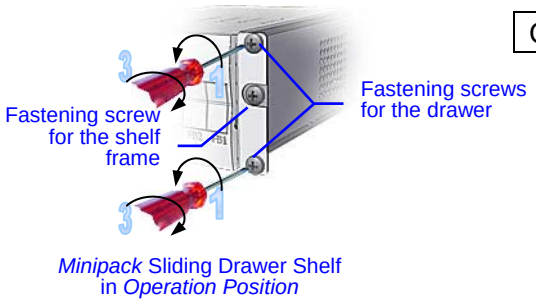
Do not relocate **already hot-plugged rectifiers** to other positions in the power shelf. **New rectifiers** must be hot-plugged in the power shelf, one at time, starting from the left with position 1, 3, 5 and 2, 4, 6.

Mounting or Removing *Minipack* Rectifier Modules

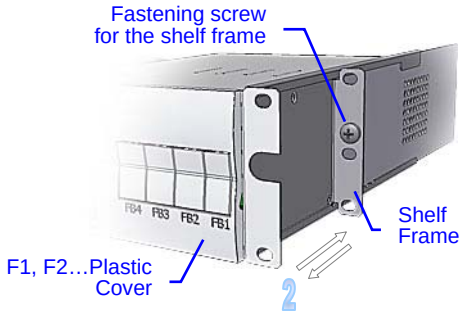
1. **Unlock the module** by
   using a screwdriver to loosen the locking screw
2. **Insert or remove the module** by
   sliding it on its mounting rail fully into the power shelf, so that the module makes proper contact (hot-pluggable)
   or
   using the front handle to pull the module loose; support from underneath before the unit is completely free
3. **Lock the module** by
   screwing home the locking screw (locked direction). Then, the module will be securely locked in the shelf, or ready for transport
4. **Mount blind covers** in
   unused module locations

Electric shock

Installation and Maintenance Details



Minipack Sliding Drawer Shelf in *Operation Position*



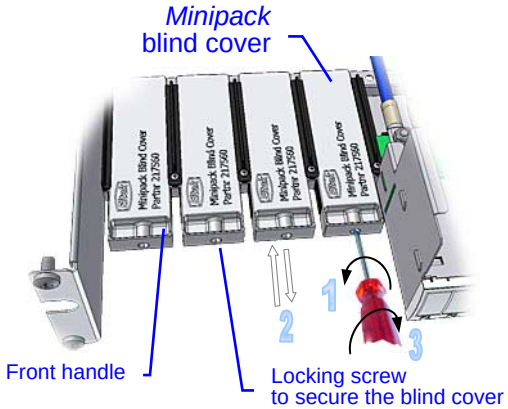
Minipack Sliding Drawer Shelf in *Maintenance Position*

Opening or Closing the *Minipack* Drawer Shelf

To access the *Minipack* distribution area, you have to open the sliding drawer shelf. Do following to open or close the drawer:

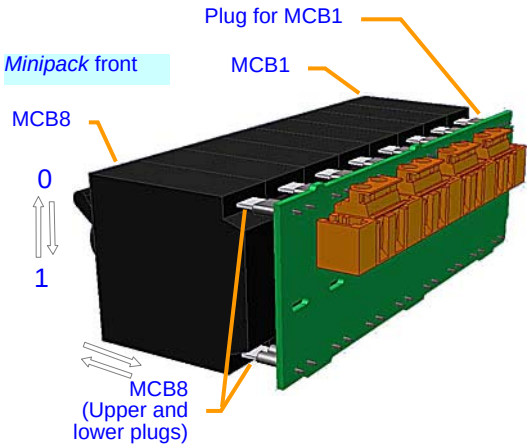
1. **Unlock the drawer shelf** by
   using a screwdriver to loosen the upper and lower locking screws. Do not loose the screw in the middle!
2. **Open or close the drawer shelf** by
   holding the drawer from the side plates and sliding it outwards.
   The drawer shelf is the in the *Maintenance Position*.
   or
   sliding it on its mounting rail fully into the shelf
3. **Lock the drawer shelf** by
   screwing home the upper and lower locking screws.
   The drawer is then securely locked in the shelf, in its *Operation Position*

Mounting or Removing *Minipack* Blind Covers



1. **Unlock the blind cover** by
   using a screwdriver to loosen the locking screw
2. **Insert or remove the blind cover** by
   sliding it on its mounting rail fully into the power shelf
   or
   sliding it out, by inserting your fingers in the cover's front handle and pulling it loose
3. **Lock the blind cover** by
   screwing home the locking screw (locked direction).
   Then, the blind cover will be securely locked in the shelf, or ready for transport

Removing or Mounting Load MCBs



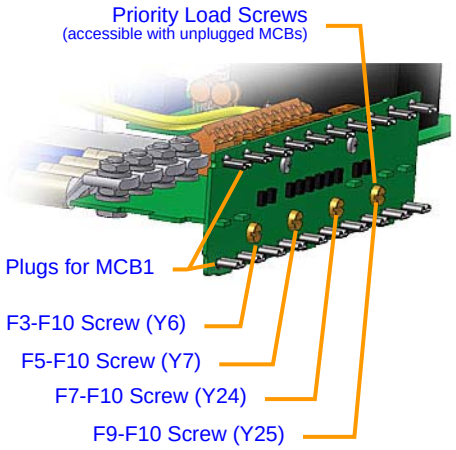
CAUTION: Power must be OFF during this operation!

1. **Remove the F1, F2… plastic cover** by
   unscrewing the cover's frontal screw,
   then inserting a small screwdriver into the cover's gap and carefully press down and out to release the locking tabs.
2. **Switch OFF the MCB** by
   switching the MCB handle to "0" position (upwards)
3. **Remove or insert the MCB** by
   using your fingers to pull out and unplug the MCB
   or
   pressing the MCB into the upper and lower plugs

Configuring Priority and Non-Priority Load Circuits

CAUTION: Power must be OFF during configuration! Only one screw may be removed.

1. **Remove the F1, F2… plastic cover** by
   unscrewing the cover's frontal screw,
   then inserting a small screwdriver into the cover's gap and carefully press down and out to release the locking tabs.
2. **Switch OFF and unplug the actual MCBs** by
   switching the MCB handle to "0" (upwards),
   then using your fingers to pull out the MCB
3. **Remove the actual Priority Load Screw** by
   using a screwdriver to unscrew the Priority Load Screw (refer to table below).
   Keep the removed screw in the clip, on the cover's inside



Configuration of Priority & Non Priority Load Circuits

Screw Removed	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
None	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**
Y25	NP	NP	NP	NP	NP	NP	NP	NP	**P**	**P**
Y24	NP	NP	NP	NP	NP	NP	**P**	**P**	**P**	**P**
Y7	NP	NP	NP	NP	**P**	**P**	**P**	**P**	**P**	**P**
Y6	NP	NP	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**

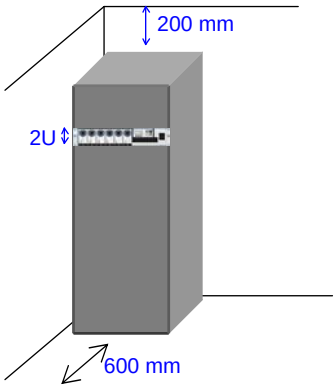
WARNING: Only one screw can be removed at a time.
P=Priority Load Circuits NP =Non Priority Load Circuits

2 Installation

Installation Steps

Check off in the *Installation Check List*, that you find in the pullout section of this folder. Also, refer to the system's specific drawings.

Preparing the Installation Site



Begin preparing the following:

1 Organize the installation site
- o A 2U high spare location in existing 19", 250 mm cabinet
- o Min. Clearances: 60 cm in front
- o Explosive atmospheres are to be avoided. Ensure suitable ventilation

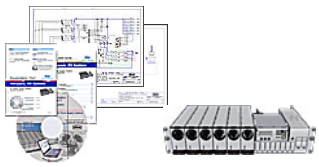
EMC regard

2 Prepare the installation tools
- o Use insulated tools suitable for telecom installations

3 Prepare AC Supply: AC input cable(s) and fuses
- o Correct type AC supply is available
- o External AC fuses have correct rating
- o AC input cable(s) are sized correctly

For external AC fuses and AC input cable ratings, refer to your site's AC supply specification. Read also our **external AC fuse recommendations** in section "*Miscellaneous*". In general, a site with better AC supply quality (stable nominal voltage) may use smaller breakers.

Mechanical Installation — Power is OFF!



Minipack PSS, Doc. Chart, Spec. Drawings, CD-ROM

Carry out the following:

4 Remove packaging and check equipment
- o Check you have received all the parts and correct documentation
- o Inspect the equipment for physical damage (report any damages)
- o Leave rectifier modules in their packaging or in the selves, if factory installed. To be installed under commissioning

Device hazard

5 Remove the cabinet's top cover and dummy front panel
- o Connection terminals are accesses by opening the drawer shelf
- o Battery shelves (if any) are placed behind the lower panels

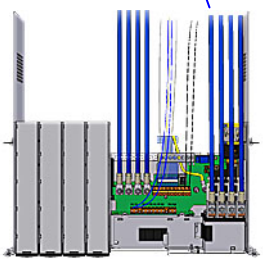
6 Position and fasten the subassembly
- o *Minipack* is fastened in existing 19" or in ETSI cabinets, using brackets

7 Mount the external batteries on the shelves
- o Start (if applicable) placing the batteries on the lower shelf first, and continue upwards
- o *Do not terminate* the battery cables yet!

Electric shock

8 Open the *Minipack* drawer shelf and lift the plastic cover
- o Unlock the upper and lower screws and slide the drawer shelf open; read the Installation & Maintenance Details chapter
- o Lift the Melenex plastic cover to access the connection terminals

Minipack drawer shelf slid out in the maintenance position



Minipack drawer shelf slid out in the maintenance position

Electrical Installation

Power is OFF!

Carry out the following: (Refer to the system's specific drawings)

CAUTION: The cable lengths must be long enough (service loop) to allow opening the *Minipack* drawer shelf.

Device hazard

9 Make the system completely voltage free

- Switch OFF or remove all load fuses (MCB1, MCBx), battery fuses (Fb1, Fbx) and the AC supply fuses, in external fuse boards

10 AC Connections

- *Check AC configuration*: the external AC supply consists of 3 single phase mains feed and earth (PE)
- *Connect the AC Earth wires (PE)* to the terminals X5:1-2 (PE)
- *Connect the AC input cables* to the terminals X5:3-4, 5-6, 7-8. Cable and terminal block labeling are to correspond

11 DC Connections — Load Circuits

- *DC Earth (TE);* check that the common DC Output Rail is connected to "Telecom Earth" (TE) at only one place (at the cabinet , cable X7A, or at a central distribution point)
- *For each DC load*, connect one of the cables to the common DC output terminal, and the other to terminal X6B:F1, F2, etc.

12 DC Connections — Alarm & Signal Circuits

Electric shock

- Refer to your system's connection drawings and configuration, or to the "Miscellaneous, Alarms & Monitoring" section, terminal blocks X1, X2A and or X2B.
- *Terminate Alarm Circuit cables* to the relay output terminals
- *Terminate Signal Circuit cables* to the digital input/output terminals

13 DC Connections — Battery Cables

Careful! Use correct polarity.

For 48V systems using the battery symmetry mid-point measurement, refer to the figure in this page.

For other measurement methods, refer to the Battery Symmetry Connections chapters in this guide's Miscellaneous section.

For each battery shelf:

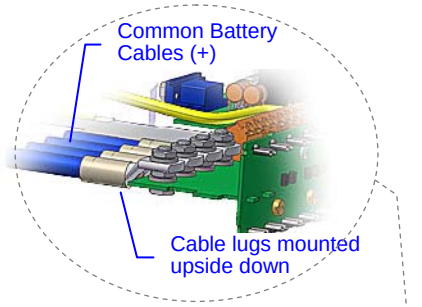
CAUTION: Mount cable lugs upside down on the (+) battery cables

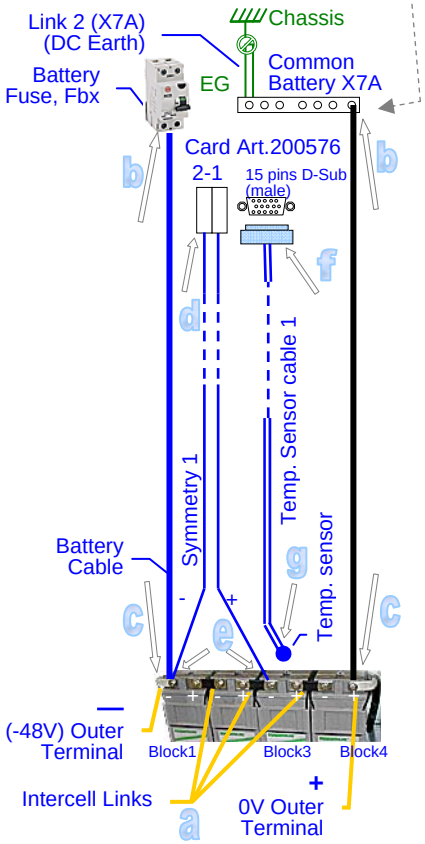
a *Mount 3 intercell links* to connect in series 4 battery blocks

b-c *Connect battery cables* to fuses (Fb1, Fb2, etc.) and Common Battery (X7A) and to the battery shelf's outer terminals; black (+); blue (-)

d-e *Connect battery symmetry cables*, if applicable, to the input terminals, and to the center terminal of the battery string (+) and to the -48V outer terminal. Deviation from factory settings requires Symmetry reconfiguration via *PowerSuite*

f-g *Connect the temperature sensor cable*, if applicable, to the D-Sub plug or input terminal, and fix the temperature sensor (at the end of the cable) to a suitable place in the middle of the installed battery bank

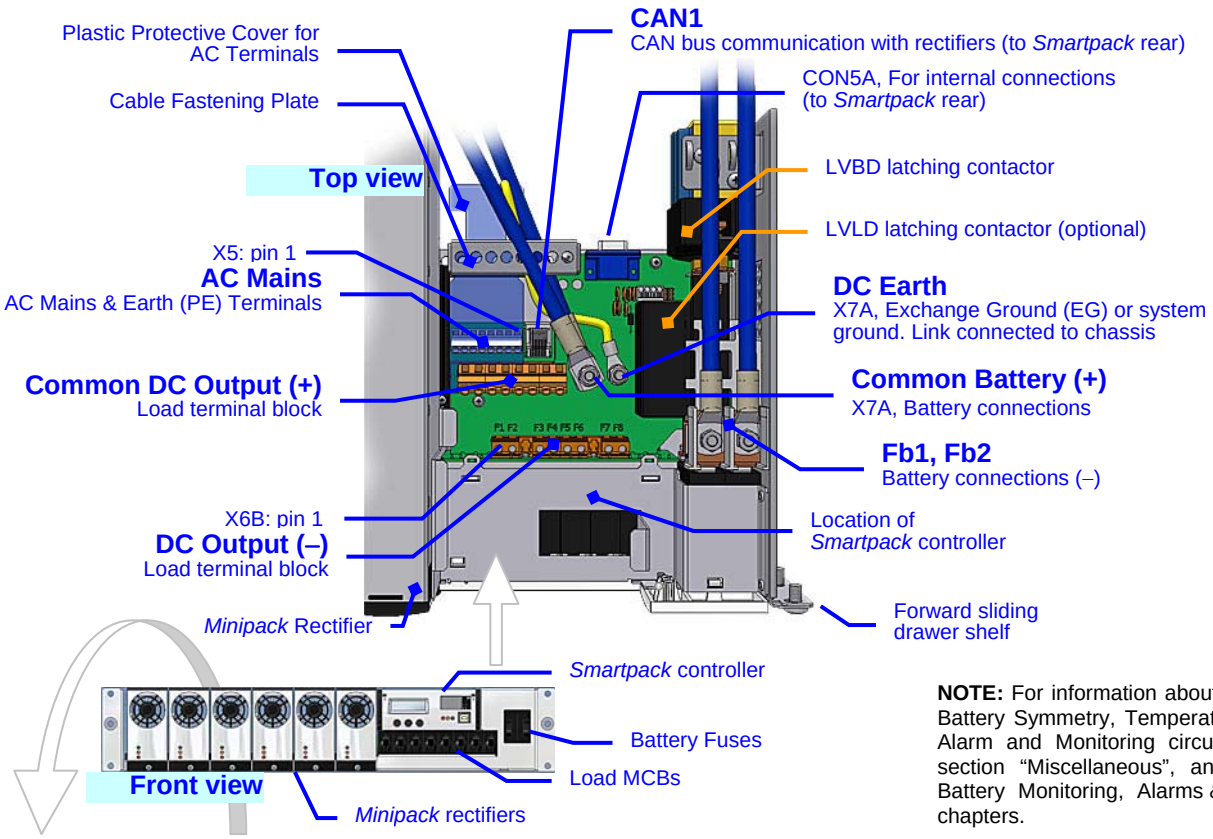




Location of Components, GA drawing

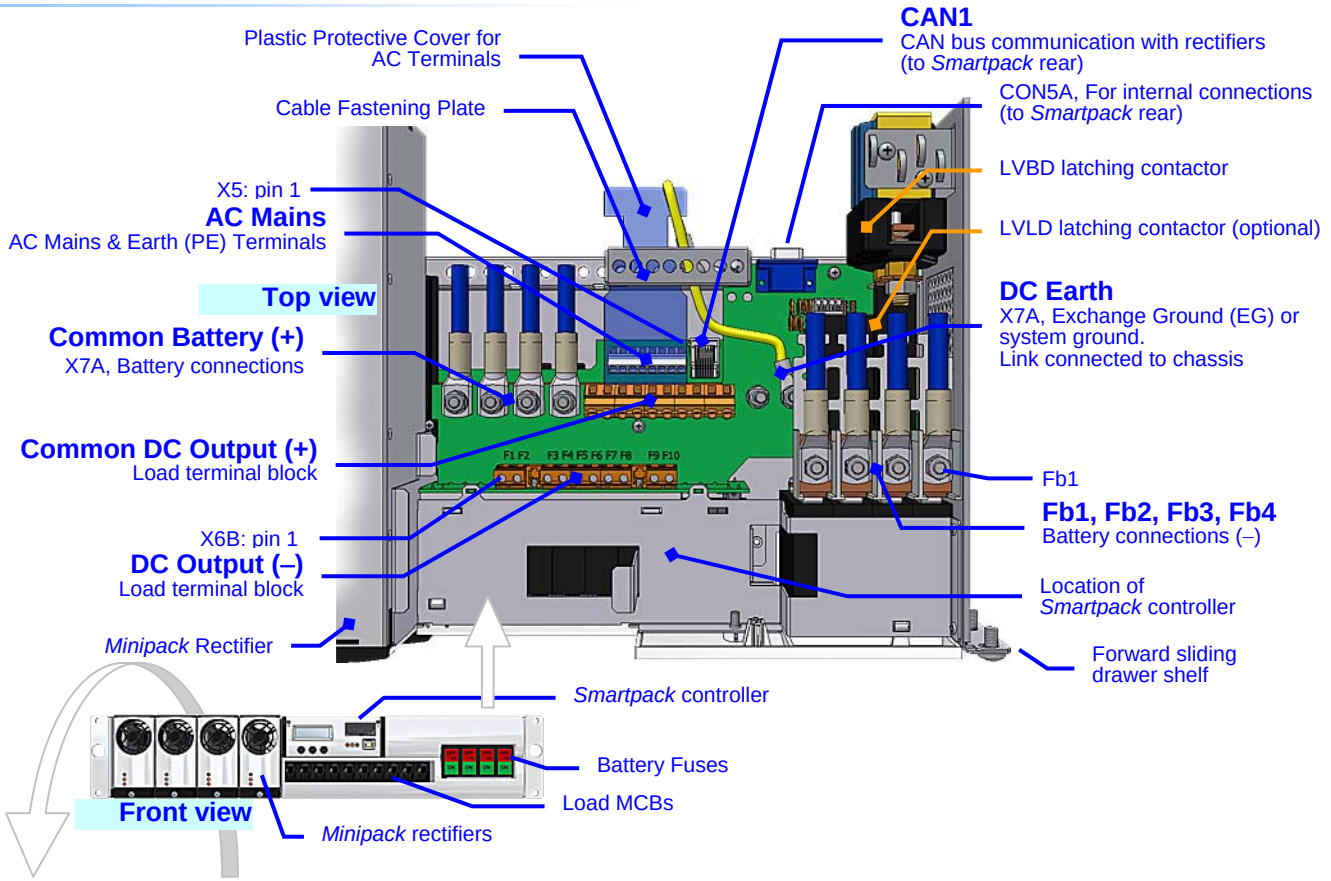
Refer to the **specific drawings** included with your *Minipack PS* system, for information regarding the exact location of components in your system.

Minipack, 6 Rectifiers (48V, 4800W)



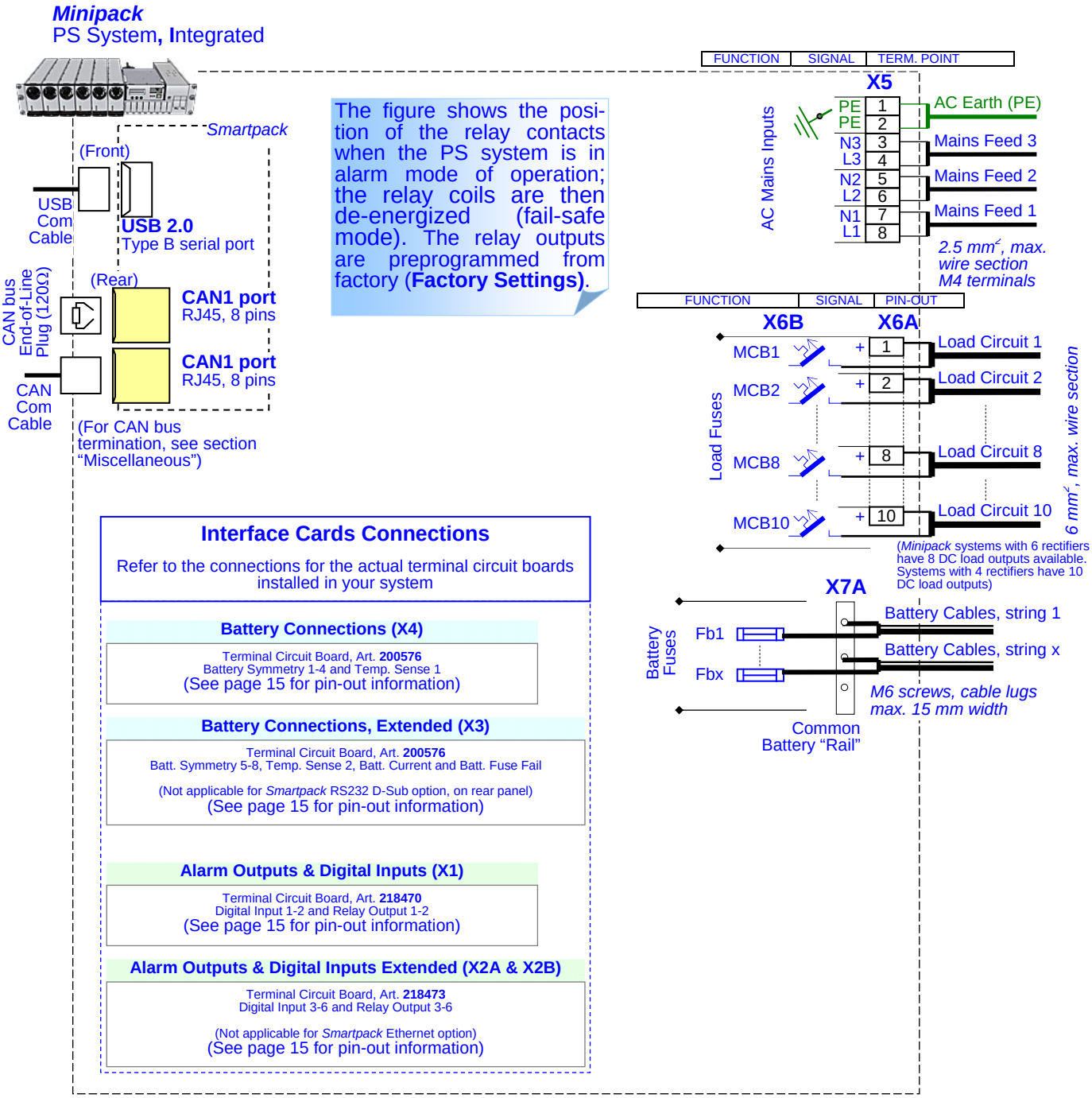
NOTE: For information about connecting Battery Symmetry, Temperature Sensor, Alarm and Monitoring circuits, refer to section "Miscellaneous", and read the Battery Monitoring, Alarms & Monitoring chapters.

Minipack, 4 Rectifiers (48V, 3200W)



Connections, Factory Settings, etc

Refer to your system's **specific drawings** for the exact connection points.



3 Commissioning

The *Minipack PSS* startup consists of following stages:

I. Perform a pre-start check before the PS system is switched ON
II. Switch ON the system with disconnected load; adjust output voltage
III. Adjust the nominal output voltage with connected batteries and load

I Pre-Start Check

Power is OFF!

Check off in the *Commissioning Procedure*, that you find in the pullout section of this folder.

If you have just finished the system installation successfully and filled in the *Installation Check List*, jump over the Pre-Start Check and continue with stage II.

Before you switch ON the *Minipack PS* system, verify the following:

Device hazard

1. **System installation is completed**
   - Ensure a correctly performed system installation, with correct polarity on all connections (*Installation Check List* filled in)
   - All cabling is securely terminated and supported
   - All components, terminal blocks, MCBs/ fuses, etc. are clearly labeled
2. **Battery and load fuses are disconnected**
   - Verify that all battery and load MCBs/ fuses are switched OFF
3. **AC input cable(s) and AC Earth wire (PE) are terminated**
   - Make sure that the AC input cable(s) are correctly connected to the AC terminals
   - Verify that the AC input cable(s) and external AC fuses are sized and rated as specified
   - Check that AC Earth (PE) is terminated, and electrically connected to chassis
4. **Site specific parameters and settings are known**
   - Read the site specific drawings and documentation
5. **AC supply and all MCBs, fuses are switched OFF**
   - Make sure that all external AC fuses and internal MCBs/ fuses are switched OFF

Commissioning Steps, Startup

Check off in the *Commissioning Procedure*, that you find in the pullout section of this folder.

After the ”Pre-start Check” is performed, you can begin with stage II. During the stage, you will switch ON the *Minipack PSS* — while the batteries and load are disconnected — then measure the output voltage, and adjust it if required. Carry out the following:

II Startup and No-Load Adjustments

Power is ON!

Device hazard

1. **Disconnect all rectifier modules, without removing them (keep original location)**
   - Verify that all *Minipack* rectifier modules are disconnected (unplugged) but NOT physically removed from the power shelf.
     Also, read about the correct rectifier position, page 14, and how to mount them, on page 3.
2. **Switch ON the system**
   - Switch ON the AC input supply (external AC fuses) to the *Minipack* system
3. **Measure and verify that the *AC input voltage* is correct**
   - Measure the AC terminals’ input voltage at the system’s AC Mains terminals
   - Verify that the AC voltage is within range

4. **Mount all *Minipack* rectifier modules in the power shelves (keep original location)**
   - Plug all rectifiers firmly inwards — one module at a time, allowing a 2s delay — to plug them in the same self location. Secure them with the locking screws. Refer to page 3.
   - Mount *Minipack* blind covers over unused positions

5. **Ensure that the *Smartpack* and all rectifier modules are working: LEDs are ON**
   - Verify correct operation, by monitoring the modules' LED lamps and display: No alarm are present on rectifiers. The *Smartpack* displays fuse alarms

6. **Connect the a PC to the PS system (to facilitate operation)**
   - Plug a standard USB A-B cable between the PC and the *Smartpack* controller
   - Start *PowerSuite* on the PC by selecting: *Start* > *All Programs* > *Eltek* > *PowerSuite* Refer to chapter "Installing *PowerSuite* — PC Application", page 13, if required
   - On the toolbar, click the "Connect" button to establish connection

7. **Measure and adjust *DC output voltage***
   - Read the DC output voltage on the controller's display
   - With a multi-meter, measure the DC output voltage at the most accessible point, e.g. between the common DC rail and the lower connection of one of the priority load MCBs
   - If required, adjust the voltage using the controller's front keys or via *PowerSuite*

8. **Verify the alarm relays are working correctly (alarm relay test)**
   - Run the alarm relay test using the controller's front keys (refer to page 12) or via *PowerSuite* (select the menu *Go* > *Output Test*)

9. **Make sure the *System Setup* is in accordance with configuration**
   - Verify system settings using the controller's front keys or via *PowerSuite*
   - Use the opportunity to enter site related information, number of used AC phases, type of batteries, etc.

Load Adjustments — Power is ON! — III

Now, you can begin with stage III, where you will adjust again the output voltage to the battery voltage, and connect the batteries and the load. Carry out the following:

10. **Adjust *DC output voltage* to measured *battery voltage***
    - Measure the battery voltage is within range (*check connections have correct polarity*)
    - Adjust DC output voltage — using the controller's front keys (refer to page 12) or via *PowerSuite*— to equal the measured battery voltage. (Important adjustment to avoid arcing when connecting the batteries)

Device hazard

11. **Unplug all rectifiers but one, and connect the battery fuses /MCBs**
    (CAUTION: Have *only one* rectifier connected, when switching ON the battery fuses. Thus, avoiding damaging all rectifiers, due to possible incorrect polarity connections, etc.)
    - Disconnect all rectifiers but one, by unlocking the locking screw and pulling them partially out. Do NOT physically remove them from the power shelf
    - Switch ON all battery fuses or MCBs

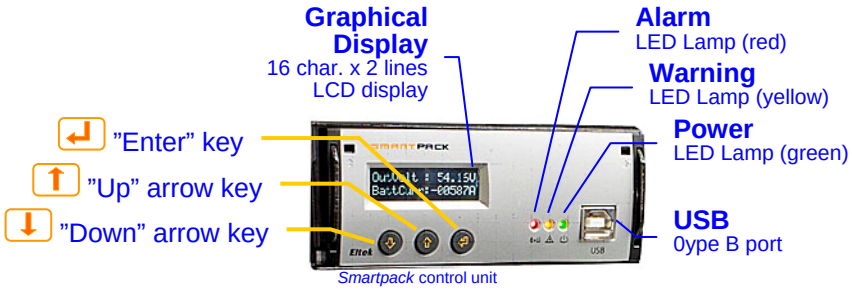
Device hazard

12. **Adjust DC output voltage again to equal the nominal battery voltage**
    - Adjust DC output voltage — using the controller's front keys or via *PowerSuite* — to equal the nominal battery voltage (or the nominal load voltage, when not using batteries)

13. **Plug in again all rectifiers, and verify the rectifiers' current sharing**
    - Connect all rectifiers again by pushing them firmly inwards — Repeat step 4, in stage II
    - Wait for about 2 min., and check — using the *PowerSuite* application —that each of the rectifiers delivers the same output current. A deviation of 1A is acceptable.

14. **Connect the load breakers and verify that no alarms are displayed**
    - Switch ON all load MCBs/ fuses
    - Verify correct operation: rectifiers and controller display no alarms

Front Keys and display, menus, etc.



Smartpack Control Unit — front keys, display, etc

Display: is in *Status Mode* (displays the system's status) or in *Menu Mode* (displays the menu structure).

Operation: Press on the ↵ key to change from *Status Mode* to *Menu Mode*. Press the ↓ or ↑ keys to scroll up or down and navigate to find menu options (function or parameter). Press then the ↵ key to select the function.

Menus: When you "enter" *Menu Mode* (Level 1), you access the *User Options*. You may also scroll down to password protected *Service Options*. Default password <0003> should be changed.

Minipack Rectifier Module — front panel

Power LED is **OFF** (mains unavailable), **Flashing** (controller accessing information) or **ON** (powered).
Warning LED is **ON** (derating or similar minor warning), **Flashing** (over-voltage mode) or **OFF** (OK)
Alarm LED is **ON** (shutdown or similar major alarm) or **OFF** (OK, no alarm)

Software Menus ~ *Smartpack* controller

Firmware 402073.009 2v00 *Smartpack*, Distributed

Level 2	Level 3	
User menu <*UserOption*>		
AlarmReset→		
VoltageInfo →	NomVolt	
	BoostVolt	
	LoBattMaj	
	LoBattMin	
	HiBattMaj	
	HiBattMin	
	LVBD	
	LVLD 1.1	
DisplayMessages→	Message ↓↑	
SoftwareInfo→		
SerialNumber→		
Rectifier Info →	NoOfRects. nn	
	RectCurrent	
	RectSerialNumber	
	Rect.PrimaryVolt	
	Rectifier Status	
	Rectifier Temp	
	Rect. OutputVolt	
	Rectifier SW Ver	
Mains Info →	NoOfPhases nn	
	Mains Status	
	Mains Voltage	
Temp Level Info→	Level ↓↑	
Battery Info →	NoOfString Nn	
	BattStringCurr ↓↑	
	BattStringTemp ↓↑	
	BattBlockVolt ↓↑	

Firmware 402073.009 2v00 *Smartpack*, Distributed

Level 2	Level 3		
Service menu <*ServiceOption*>			
Change Language →	English ↓↑		2v0
VoltAdjustment →	NomVolt	↓↑	
	BoostVolt	↓↑	
	LoBattMaj	↓↑	
	LoBattMin	↓↑	
	HiBattMai	↓↑	
	HiBattMin	↓↑	
	LVBD	↓↑	
	LVLD 1.1	↓↑	
VoltCalibration →	VoltCal ↓↑		
ChangePassword →	Password ↓↑		
SetManBoostTime →	↓↑		
Start/StopBoost →			
Auto Boost Config. →	Enable/Disable ↓↑ & Threshold ↓↑		
Batt Test Setup →	Nxt Test DateTime	Date ↓↑ Time ↓↑	
	End Volt	↓↑	
	MaxTestDur	↓↑	
	Test Int	↓↑	
	Guard Time	↓↑	
Start/Stop Test →			
NoOfRects. ; nn →	Reset		
Charge Curr Lim. →	Enable/Disable ↓↑ & Max C.Curr ↓↑		
Battery Setup →	NumOfString	↓↑	
	CellCap Ah nn	↓↑	
Output Control →	VoltageCtrl / TempComp ↓		
Change Date/Time →	Date ↓↑ Time ↓↑		
RelayTest →	Alarm Output 1	↑	
	Alarm Output 2	↑	
	Batt Contactor	↑	
	Load Contactor	↑	
	Alarm Output nn	↑	
BlockOutputs →	Enter OutpBlocked/Exit OutpBlocked		2v0
BattLifeTime Rst →			

The "XvX" references, if any, on the right hand of the option, are not shown in the display. They only indicate the firmware version (402073.009 XvX) the option was first implemented.

Check Lists Pullout

Pull out the pages with the gray outer band,
and use them as check lists

INSTALLATION CHECK LIST

System Data

Minipack PS System

Minipack Power Supply System, type:			Article No.:
Site, name:			
Serial No.:	Software, version No.:		Rectifiers, type & number of:
AC Input Voltage, measured:	Battery Type:	Battery Capacity:	Installation carried out by, name:

Site Preparations

CARRY OUT FOLLOWING:	OK
1. Organize the installation site o Prepare a 2U high spare location in existing 19", 250 mm cabinet; Check min. clearance: front access, 60 cm o Ensure the installation site is suitably ventilated and in a non-explosive atmosphere.	☐
2. Prepare the installation tools o Check that insulated tools suitable for telecom installations are used	☐
3. Prepare AC Supply: AC input cable(s) and fuses o Check the AC supply is the correct type, and that the external AC fuses and AC input cable(s) are suitably rated	☐

EMC regard

Mechanical Installation

Power is OFF!

CARRY OUT FOLLOWING:	OK
4. Remove packaging and check equipment o Check you have received all the parts and correct documentation. o Inspect the equipment for physical damage (report any damages) o Leave rectifier modules in their packaging or in the selves, if factory installed. (commissioning task)	☐
5. Remove the cabinet's top cover and dummy front panels o Check that cable entry from the top is possible o Connection terminals are accesses by opening the drawer shelf	☐
6. Position and fasten the subassembly o *Subassemblies* in existing 19" or in ETSI cabinets, using brackets.	☐
7. Mount the external batteries on the shelves o Start (if applicable) on the lower shelf first, and continue upwards o *Do not terminate* the battery cables yet!	☐
8. Open the *Minipack* drawer shelf and lift the plastic cover o Unlock the upper and lower screws and slide the drawer shelf open, then lift the Melenex plastic cover	☐

Device hazard

Electric shock

Electrical Installation

Power is OFF!

CARRY OUT FOLLOWING:	OK
9. Make the system completely voltage free o Switch OFF or remove all load fuses (MCB1, MCBx), battery fuses (Fb1, Fbx) and external AC supply fuses	☐
10. AC Connections o *Check AC configuration*: Make available 3 single phase mains feed and earth (PE) o *Connect the AC Earth wire (PE)* to the terminals AC Earth (PE) o *Connect the AC input cable(s)* to the terminals. Cable and terminal block labeling are to correspond	☐
11. DC Connections — Load Circuits o *Terminate DC Earth (TE):* Common DC Output Rail is connected to TE at only one place o *For each DC load*, connect one of the cables to the common DC output terminal; the other to the fuse terminal	☐
12. DC Connections — Alarm & Signal Circuits o Refer to your system's connection drawings and configuration, or to the Quick Start Guide o *Terminate Alarm Circuit cables* to the relay output terminals o *Terminate Signal Circuit cables* to the digital input/output terminals	☐
13. DC Connections — Battery Cables *Careful! Use correct polarity.* For each battery shelf, o *Mount 3 intercell links* to connect in series 4 battery blocks o *Connect battery cables* to fuses and Common Battery, and to the shelf's outer terminals; black (+); blue (-) o *Connect battery symmetry cables*, if applicable, to the input terminals o *Connect the temperature sensor cable*, if applicable, to the D-Sub plug or input terminal, and fix the sensor (at the end of the cable) to a suitable place in the middle of the installed battery bank	☐

Electric shock

Approval

Responsible of installation, sign.:	Date:	Approved by customer, sign.:

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CIRCUIT DISTRIBUTION LIST

System Data

Minipack PSS, type:	Article No.:
Site, name:	

CIRC.	NO.	FUSE -	TYPE MCB	LVLD CONTROLLED	DESCRIPTION	FUSE AMPERE	CABLE mm^2
BATT.	Fb1						
	Fb2						
	Fb3						
	Fb4						
LOAD	F1						
	F2						
	F3						
	F4						
	F5						
	F6						
	F7						
	F8						
	F9						
	F10						

Form 175-gb-v1-C01_356808-103_qstart-inst-comm-oper_minipack-pss_1v1ev.doc_mfm_2006-12-29

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COMMISSIONING PROCEDURE

System Data

Minipack PS System

Supplier's Order No.:	*Minipack Power Supply System*, type:		Article No.:
Site, name:			
Serial No.:	Software, version No.:		Rectifiers, type & number of:
AC Input Voltage, measured:	Battery Type:	Battery Capacity:	Commissioning carried out by, name:

I Pre-Start Check

Power is OFF!

Device hazard

CHECK FOLLOWING:		OK
1. Minipack system installation is completed;	The *Minipack Installation Check List* is filled in. All cabling is securely terminated with correct polarity	☐
2. All battery and load MCBs/ fuses are disconnected		☐
3. AC input cable(s) and AC earth wire (PE) are terminated		☐
4. Site specific parameters and settings are known		☐
5. AC supply and all MCBs/ fuses are switched OFF		☐

II Start-up, No-Load & Load Adjustments

Power is ON!

Device hazard

CARRY OUT FOLLOWING:		OK
1. Disconnect all rectifier modules, without removing them (keep original location)		☐
2. Switch ON the system (external AC fuses ON)		☐
3. AC input voltage is correct;	Measure and verify	☐
4. Insert all *Minipack* rectifiers in their original locations in the power shelves		☐
5. The *Smartpack* and all rectifier modules are working, LEDs are ON;	Verify	☐
6. Connect a PC to the PS system	Install the *PowerSuite* software, if required	☐
7. DC output voltage;	Measure and adjust	☐
8. Alarm relay test;	Verify all alarm relays are working correctly	☐
9. System Setup is in accordance with configuration	Enter site spec. info in *PowerSuite*	☐

III

Device hazard

10. Adjust DC output voltage to equal measured battery voltage	Check correct polarity!	☐
11. Unplug all rectifiers but one, and connect all battery fuses/ MCBs		☐
12. Adjust DC output voltage to equal nominal battery or load voltage		☐
13. Plug in again all rectifiers, and verify the rectifiers' current sharing		☐
14. Connect all load MCBs/ fuses, and verify no alarms are displayed		☐

Approval

Responsible of commissioning, sign.:	Date:	Approved by customer, sign.:

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ELTEK VALERE

PULLOUT

MAINTENANCE PROCEDURE

System Data

Minipack PS System

Minipack Power Supply System, type:			Article No.:
Site, name:			
Serial No.:	Software, version No.:		Rectifiers, type & number of:
AC Input Voltage, measured:	Battery Type:	Battery Capacity:	Maintenance carried out by, name:

Electric shock

WARNING: Maintenance work on live equipment is only to be performed by authorized and qualified persons using insulated tools. Hazardous voltages inside may cause terminal injury.

System Inspection

Power is ON!

CARRY OUT FOLLOWING:	OK
1. Site specific parameters and settings are known. User manuals and site specific connection & arrangement drawings are available.	☐
2. The battery bank has been fully charged in advance. At least for 12 hours since start-up or mains failure. Enables correct measurements & calibration	☐
3. The equipment is free from damage, dust or dirt; verify. Carefully vacuum clean or remove any accumulation of dust, corrosion or dirt.	☐
4. All cabling and copper bars are securely terminated and supported. Correct any loose connections, excessive cable temperature, defective insulation, etc.	☐
5. The *Smartpack* & all rectifier modules are ON, no alarm present; verify. Otherwise, correct and put the PS system in normal mode of operation.	☐
6. All rectifier's functionality & *Smartpack*'s keys and display work OK; verify Correct possible abnormalities before continuing.	☐
7. Connect the PS system to a PC (install the *PowerSuite* application if required) The *PowerSuite* program in the PC enables system configuration from the PC.	
8. Rectifiers' load current sharing; verify. Use the *PowerSuite* PC application to check all rectifiers output the same amount of current (±1A)	☐
9. Display the stored log of Alarm Messages. Using the keypad on the *Smartpack* controller or from the PC.	☐

System Adjustment

CARRY OUT FOLLOWING:	OK
1. DC Output Voltage Calibration; ensure correct display readings. If measured DC output voltage at the load terminals deviates more than ±1% from the display reading, calibrate the output voltage from the *Smartpack*'s keypad or the PC.	☐
2. Load & Battery Current Calibration; verify correct display readings. Measure with a clip-on ammeter the battery current & every load circuit current. Calculate the total load & battery current. If the calculated total values deviate more than ±1% from the display readings, calibrate the current from the PC (calibration value>50% of system's max. capacity)	☐
3. DC Output Voltage Adjustment; measure and adjust. Measure and, if required, adjust the output voltage to the nominal voltage recommended by the battery manufacturer. (Voltage measurements to be done at the DC rail, with little load current)	☐
4. Alarm Relay Test; verify all alarm relays are working correctly. From the *Smartpack*'s keypad or PC use the Relay Test function; verify activation of external equipment	☐
5. Battery bank control; measure and verify battery specifications. Follow the recommendations of the actual battery manufacturer.	☐

Approval

Responsible of maintenance control, sign.:	Date:	Approved by customer, sign.:

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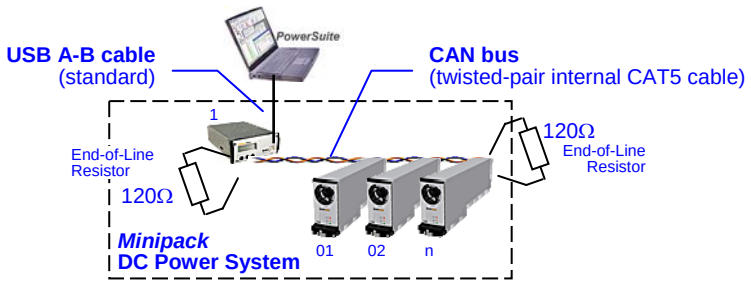
Check Lists Pullout

Pull out the pages with the gray outer band,
and use them as check lists

CAN Bus Termination

Minipack systems are shipped from factory with the CAN bus already terminated with 120Ω resistors.

To ensure a correct bus communication and avoid data reflection, you must *always* terminate the CAN bus with two 120Ω resistors, one at each end of the line. The figure shows a *Minipack* system, with its controller communicating with the rectifiers via the CAN bus.

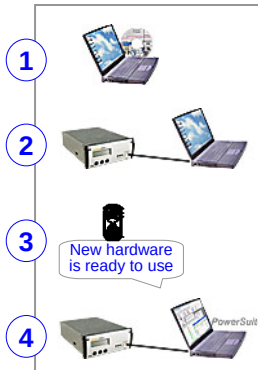


Smartpack assigns ID numbers to the rectifiers (software-assigned). The *Smartpack's* ID numbers are assigned by DIP switches on the controller's side.

Installing *PowerSuite* — PC Application

The *PowerSuite* software application enables you to configure and operate the *Minipack* Power Supply System from a personal computer.

Minipack system configuration from a PC running *MS Windows XP*



1. **Install *PowerSuite***
   Insert CD in your PC drive and follow & accept the wizard default steps to install *PowerSuite*

2. **Switch *Smartpack* ON and plug USB cable** (Part 202073)
   to *Smartpack* and to any available USB port in the PC

3. **Wait for Windows to detect the *Smartpack* controller**
   If required, a wizard will automatically install necessary USB drivers. Follow & accept the wizard default steps

4. **Start *PowerSuite* and establish connection**
   Select "Start > All Programs > Eltek > **PowerSuite**". On the toolbar, click "**Connect**" button. On the Connection dialogue box, click the "**Connect**" button

If *PowerSuite* fails communicating via the standard COM port, find the COMx assigned to *Smartpack*, by selecting menu option "Tools > Options" (click on the Find COMx button).

PowerSuite's newest version is always available on our FTP server. Call your *Eltek Valere's* contact person.

External AC Fuses — Recommended Rating

The site's AC supply quality is of great importance. In general, a site with better AC supply quality (stable nominal voltage) may use smaller breakers.

Use the recommendations in the 205VAC table, if you are sure the available AC mains voltage will not drop below 205VAC.

OR

If you are unsure — or know that the voltage may drop below 205VAC — use the 185VAC table recommendations.

Doc 2024398, v1

Minipack Rectifiers 48 VDC, 800W

205VAC Inputs

AC Mains Type	No of Rectifiers	Current Max. (A) per Input	Ext. Fuse Type
230VAC 1 phas	4 6	17.5 26.3	20A-C 32A-C

185VAC Inputs

AC Mains Type	No of Rectifiers	Current Max. (A) per Input	Ext. Fuse Type
230VAC 1 phas	4 6	19.4 29.5	20A-C 32A-C

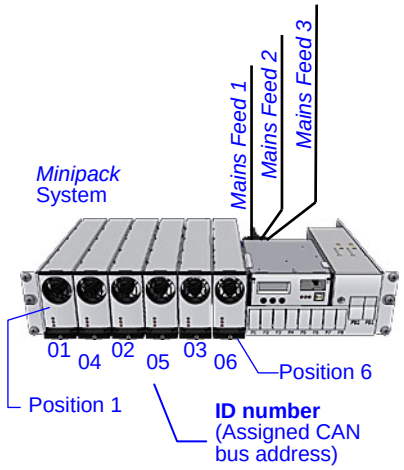
Each mains input feeds 2 rectifiers

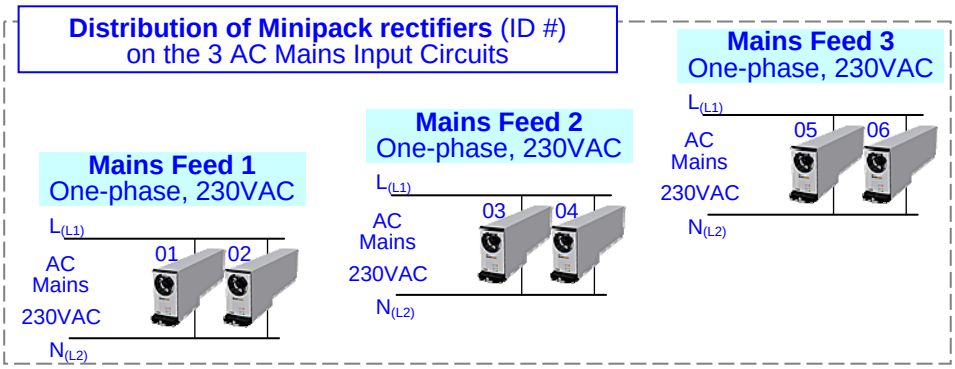
Note:
The recommendations apply for use of Thermal magnetic circuit breaker, type Siemens 5SX or 5SY series, MG C60H series or similar. For more information regarding External AC fuses and other types of fuses, please read the article 2024398 on the CD, 356808.CD3.

Mains Feeds versus Rectifier ID

Mains Monitoring

The *Minipack* system is fed with 3 One-phase 230VAC Mains input circuits. Each input circuit is internally connected to feed 2 rectifiers, in such a pattern that loads the 3 circuits evenly.





Plug-and-Play Rectifiers versus Mains Monitoring

When a rectifier is **hot plugged in a power shelf for the first time**, the *Smartpack* controller assigns the next available ID number to the rectifier, starting with "01".

When a **previously installed (hot plugged)** *Minipack* rectifier is inserted in a power shelf, the *Smartpack* controller "recognizes" the module, and assigns the same ID to the rectifier. In other words, the controller and the rectifier "remember" the assigned ID number, even after removing and reinserting the rectifier in the shelf.

To achieve a more controlled ID assignment, you should always insert & hot-plug new *Minipack* rectifiers in the power shelf, **one module at a time, in following shelf position order: 1, 3, 5 and 2, 4, 6.**

Position #	1	2	3	4	5	6
ID #	**01**	***04***	**02**	***05***	**03**	***06***

This position-versus-ID number relationship is very important for the correct monitoring of the mains circuit, as **the *Smartpack* controller always uses rectifier ID01, 02 and 03 to monitor the Mains Feed 1, 2 and 3 respectively**. If these rectifiers malfunction, rectifier ID 04, 05 and 06 will automatically take over.

For example: accidentally inserting a rectifier with ID02 in a power shelf position internally connected to mains feed 1, will cause the controller to monitor mains feed 1 "thinking" it monitors mains feed 2.

Battery Symmetry Connections

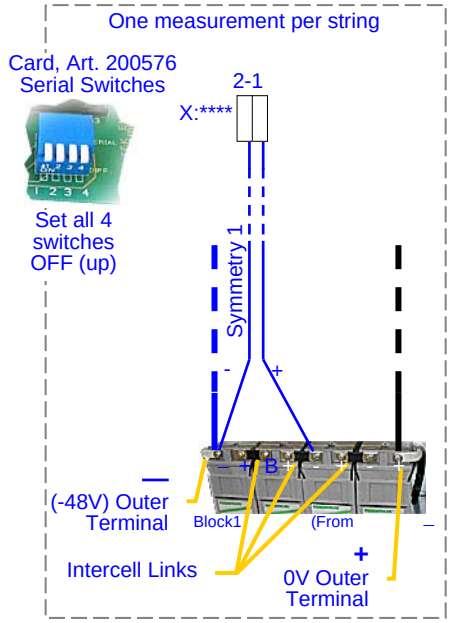
Connections

Each *Smartpack* controller is equipped with 8 battery symmetry inputs (on connectors CON4 and CON3), enabling symmetry measurement of:

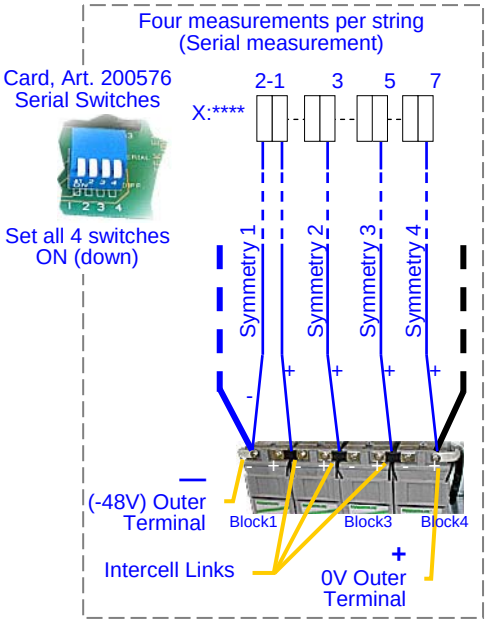
- 8 battery strings
  using the *Mid-Point Measurement Method*
- 4 battery strings
  using the more accurate *Double Mid-Point Measurement Method*
- 2 battery strings
  using the even more accurate *Block Measurement Method*

You can implement any of these methods using one or two *Battery Connection Kits* (see the illustration next page) and the appropriate number of *Battery Symmetry Kits*, which contain a single cable strand with suitable cable eyes, etc.

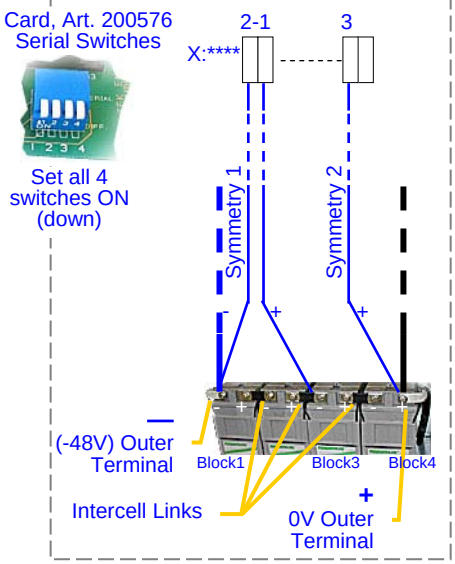
Battery Symmetry
Mid-point Measurement



Battery Symmetry
Block Measurement

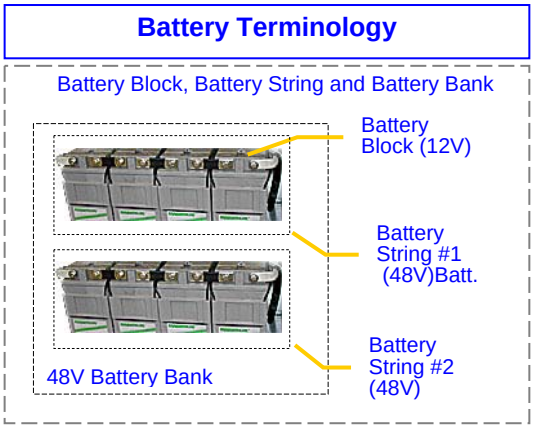


Battery Symmetry
Double-point Measurement



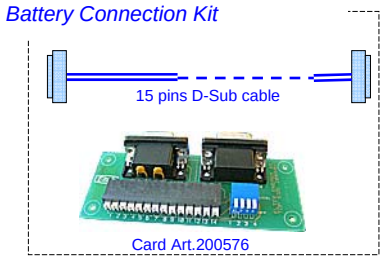
Notice that, if you open the serial switches in card, Art. 200576 — setting all to OFF (up) — you have to connect the + and – wires of every symmetry input.

Battery Terminology



Battery Interface Card ~ Terminals & Pin-out

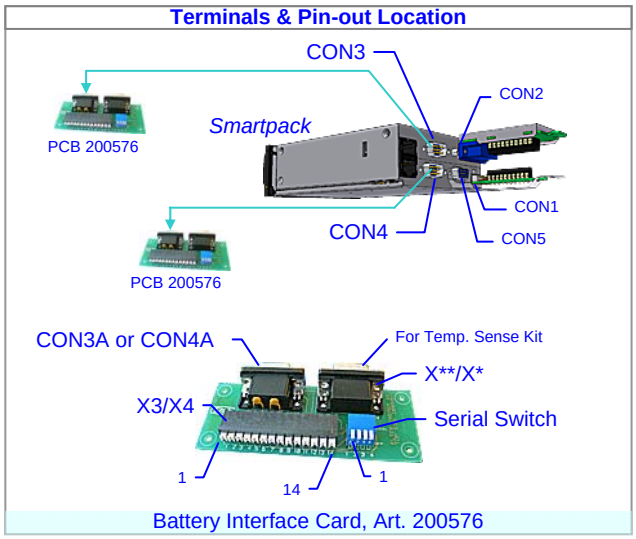
The *Smartpack* controller's battery monitoring signals are accessible on D-Sub connectors CON4 and CON3, on the controller's rear panel.

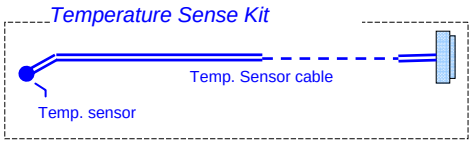


Using the *Battery Connection Kit* — which consists of a ***Battery Interface Card*** **(Art. 200576)** and a standard 15 pins D-Sub cable — you can make the signals on CON4 accessible at any suitable location inside your system, e.g. near the battery blocks.

When extra battery monitoring signals are required, you can use an extra *Battery Connection Kit* connected to the controller's CON3.

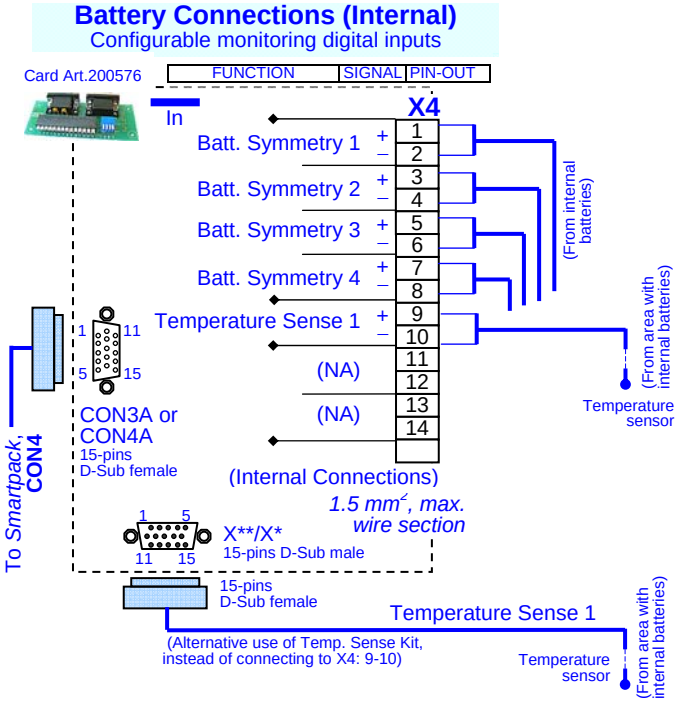
For detailed information about the card's pin-out location and terminal block connections, see the figures in this section.

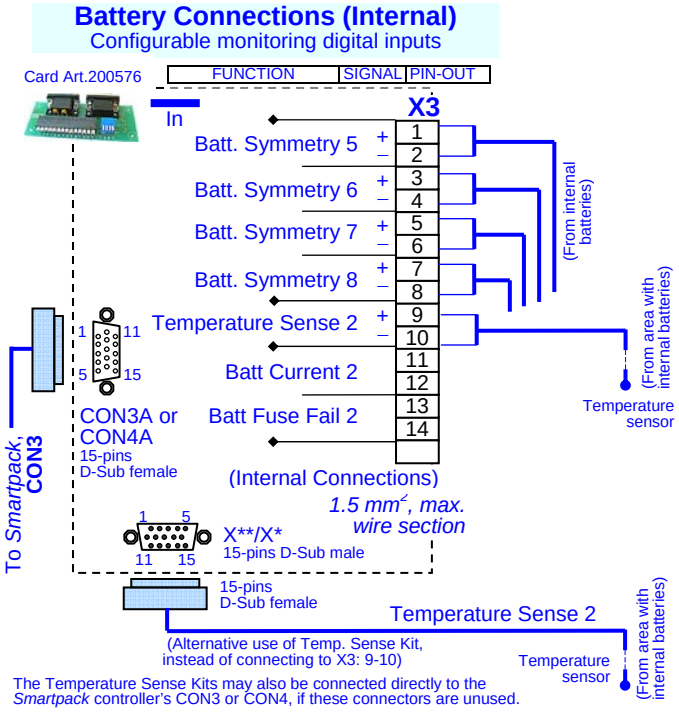




For temperature monitoring of the battery compartment, we recommend the use of the *Temperature Sense Kit*, instead of connecting the sensor cable directly to the terminals, pin 9-10.

The *Temperature Sense Kit* is connected to the *Battery Interface Card* (Art. 200576), or directly to the controller's CON3 or CON4, if unused.

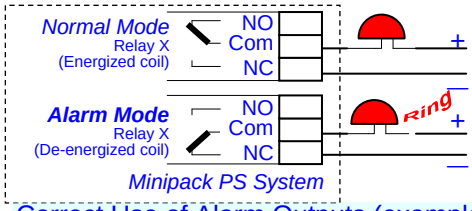




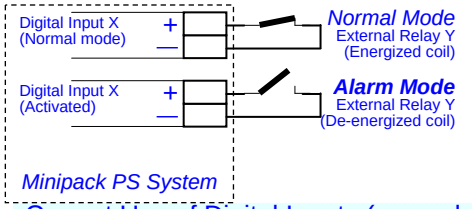
Standard Alarm Relays & Digital Inputs

Connections

Standard Relays & Digital Inputs



Correct Use of Alarm Outputs (example)



Correct Use of Digital Inputs (example)

The alarm outputs in *Minipack* systems use the *Fail-Safe Operation Mode* (relay coils energized in the system's normal operation mode). When the system is in alarm mode, the alarm relay coils are de-energized.

In order to implement monitored fail-safe digital inputs circuits, the external relay coil must be energized and the contact closed in the system's normal mode of operation. See the figures.

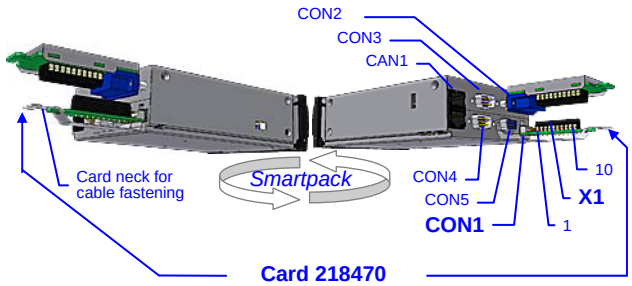
Alarm Interface Card ~ Terminals & Pin-out

The *Smartpack* controller's alarm and digital input monitoring signals are accessible from the controller's rear panel, on mini power connector CON1 (2 outputs & 2 inputs).

Using the ***Alarm Interface Card*** **(Art. 218470)** plugged to *Smartpack's* CON1, you can make the signals on CON1 accessible on terminal block X1.

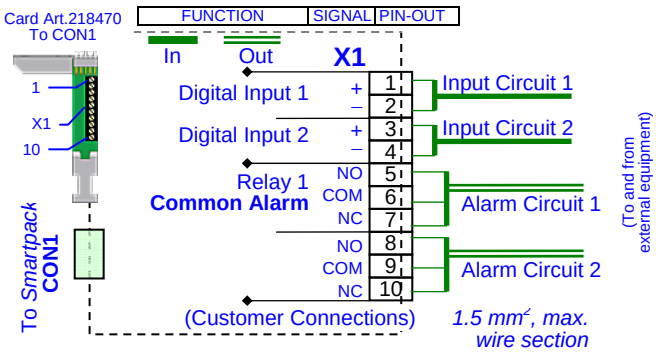
For detailed information about the card's pin-out location and terminal block connections, see the figures in this section.

Terminals & Pin-out Location



Alarm Outputs & Digital Inputs Card
Art. 218470

Alarm Outputs & Digital Inputs
Voltage free relay outputs and Configurable monitoring digital inputs



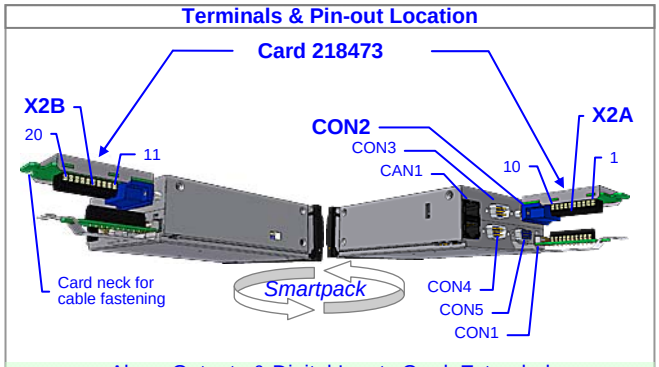
Alarm Interface Card, Extd. ~ Terminals & Pin-out

Additional alarm and digital input monitoring signals are accessible from the *Smartpack* controller's rear panel, on D-Sub connector CON2 (4 outputs & 4 inputs).

Using the ***Alarm Interface Card, Extended*** **(Art. 218473)** plugged to *Smartpack's* CON2, you can make the signals on CON2 accessible on terminal blocks X2A and X2B.

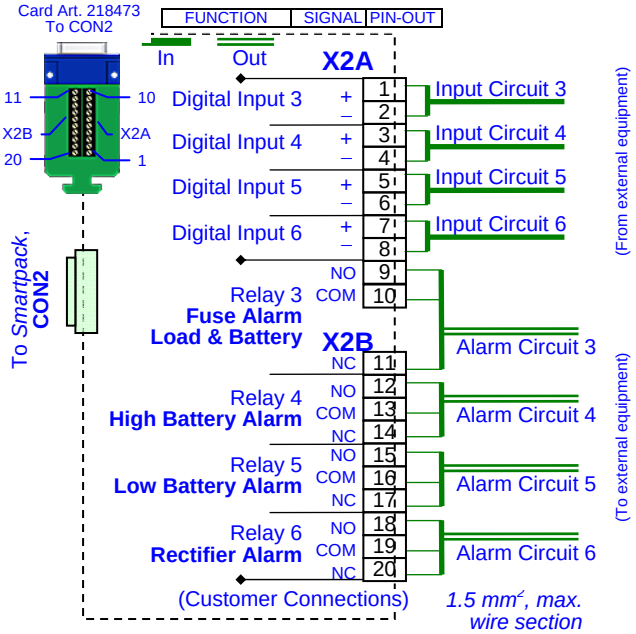
For detailed information about the card's pin-out location and terminal block connections, see the figures in this section.

Terminals & Pin-out Location



Alarm Outputs & Digital Inputs Card, Extended
Art. 218473
(NA for *Smartpack* Ethernet option)

Alarm Outputs & Digital Inputs, Extended
Voltage free relay outputs and Configurable monitoring digital inputs

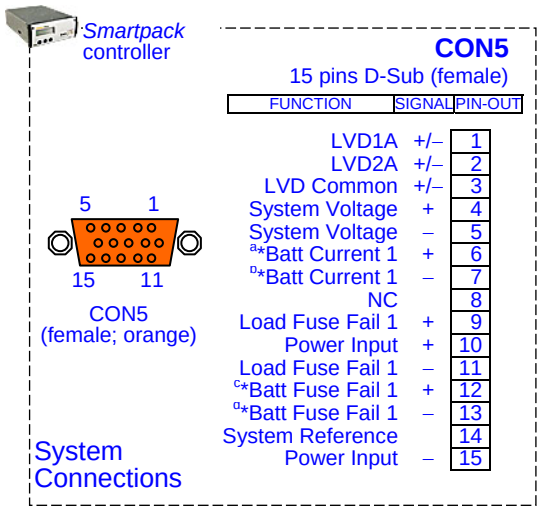


System Interface Card ~ Terminals & Pin-out

Minipack systems are shipped from factory with the CON5 signals already connected.

Some of the *Smartpack* controller's internal system signals are accessible on D-Sub connector CON5, on the controller's rear panel.

Using a standard 15 pins D-Sub cable, the signals on CON5 are routed to the *Minipack* system's main circuit board. See the figure in this section for an overview of the signals on CON5,

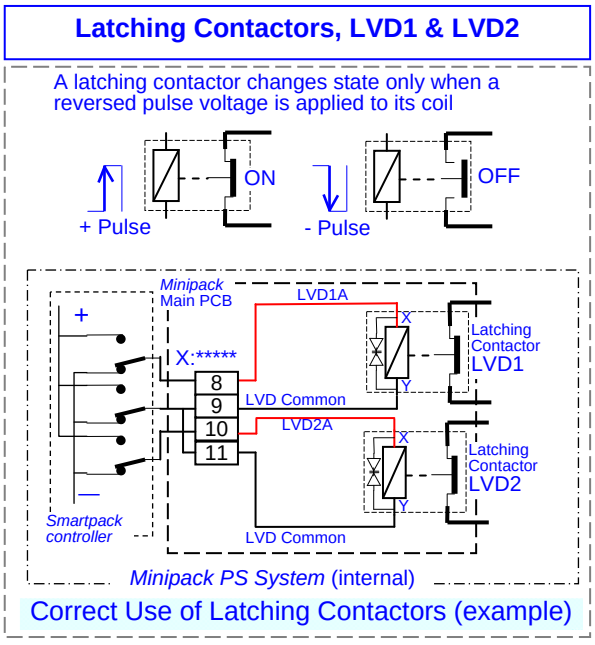


LVD Latching Contactors

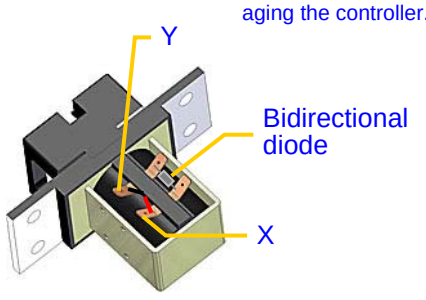
Connections

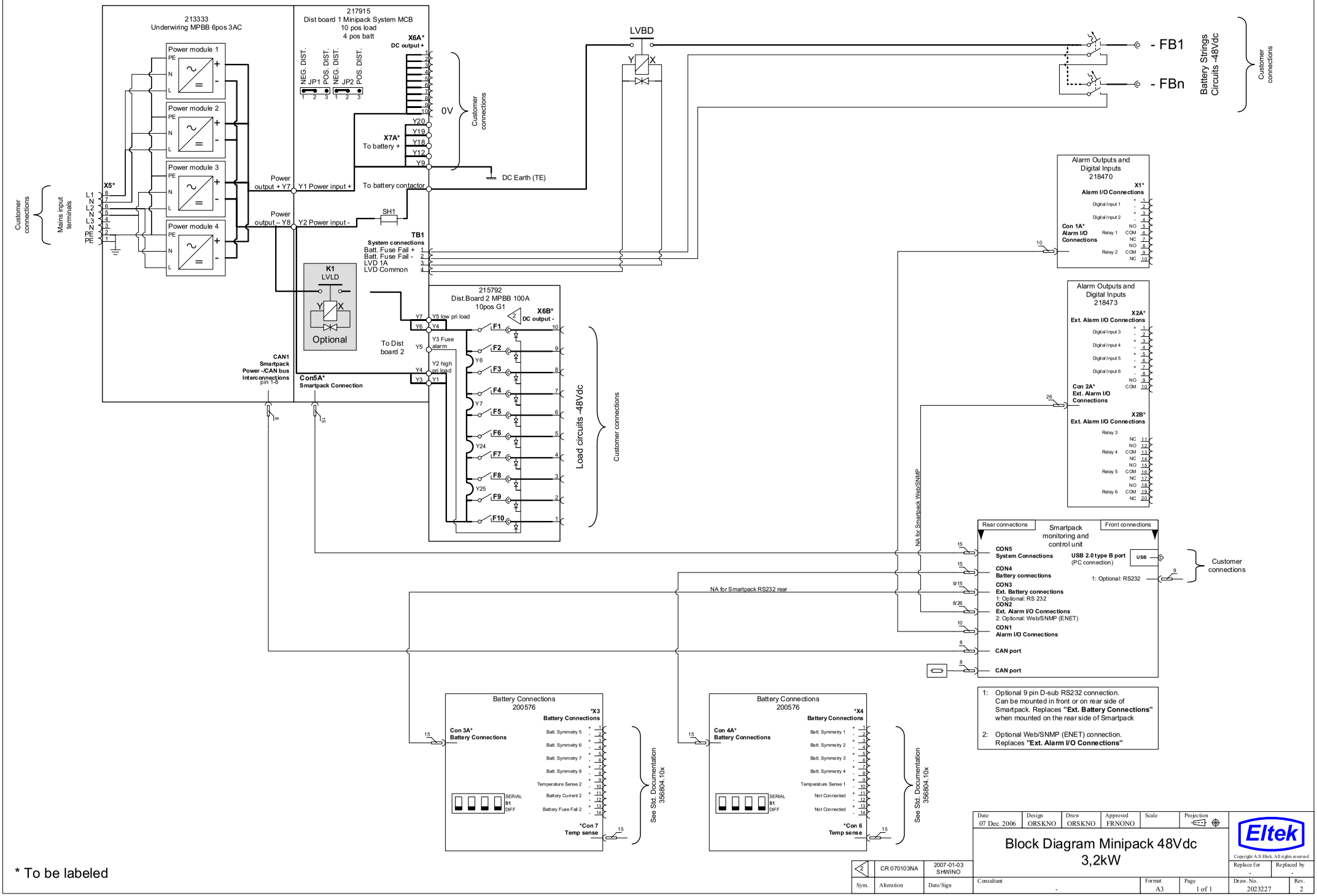
Minipack systems' LVBD and LVLD functionality (Low Voltage Battery Disconnect; LV Load Disconnect) is implemented by the *Smartpack* controlling magnetically latching contactors.

The coil of latching contactors is not energized in any state. They change state from open to close, or vice versa, when a reversed pulse is applied to the coil.



Warning! The bidirectional diode must always be mounted to avoid damaging the controller.





* To be labeled

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Date	Design	Draw	Approved	Scale	Projection
07 Dec. 2006	ORSKNO	ORSKNO	FRNONO		

Block Diagram Minipack 48Vdc 3,2kW

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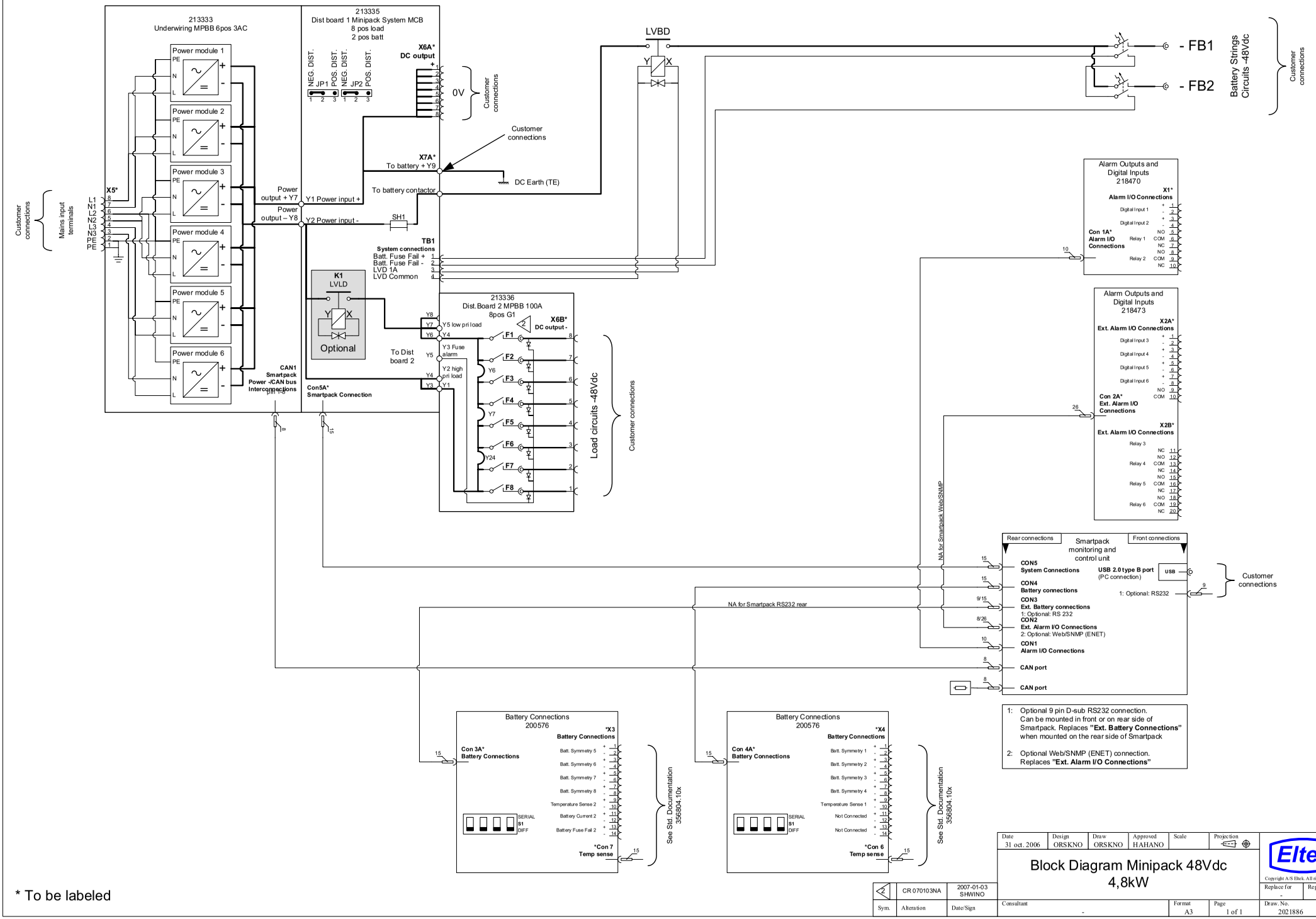
213333
Underwiring MPBB 6pos 3AC
Power module 1
Power module 2
Power module 3
Power module 4
Power module 5
Power module 6
X5*
Mains input terminals
Customer connections
Power output + Y7
Power output – Y8
213335
Dist board 1 Minipack System MCB
8 pos load
2 pos batt
NEG. DIST.
POS. DIST.
JP1
JP2
X6A*
DC output
0V
Customer connections
X7A*
To battery + Y9
To battery contactor
DC Earth (TE)
Y1 Power input +
Y2 Power input -
SH1
TB1
System connections
Batt. Fuse Fail +
Batt. Fuse Fail -
LVD 1A
LVD Common
K1
LVLD
Optional
213336
Dist.Board 2 MPBB 100A
8pos G1
X6B*
DC output -
Y5 low pri load
Y3 Fuse alarm
Y2 high pri load
To Dist board 2
F1
F2
F3
F4
F5
F6
F7
F8
Load circuits -48Vdc
Customer connections
CAN1
Smartpack
Power -/CAN bus
Interconnections
Con5A*
Smartpack Connection
LVBD
- FB1
- FB2
Battery Strings
Circuits -48Vdc
Alarm Outputs and
Digital Inputs
218470
X1*
Alarm I/O Connections
Con 1A*
Alarm I/O
Connections
Alarm Outputs and
Digital Inputs
218473
X2A*
Ext. Alarm I/O Connections
Con 2A*
Ext. Alarm I/O
Connections
X2B*
Ext. Alarm I/O Connections
NA for Smartpack Web/SNMP
Rear connections
Front connections
Smartpack
monitoring and
control unit
CON5
System Connections
USB 2.0 type B port
(PC connection)
USB
CON4
Battery connections
CON3
Ext. Battery connections
1: Optional: RS 232
1: Optional: RS232
CON2
Ext. Alarm I/O Connections
2: Optional: Web/SNMP (ENET)
CON1
Alarm I/O Connections
CAN port
CAN port
NA for Smartpack RS232 rear
Battery Connections
200576
*X3
Battery Connections
Con 3A*
Battery Connections
Batt. Symmetry 5
Batt. Symmetry 6
Batt. Symmetry 7
Batt. Symmetry 8
Temperature Sense 2
Battery Current 2
Battery Fuse Fail 2
SERIAL
S1
DIFF
*Con 7
Temp sense
See Std. Documentation
356804.10x
Battery Connections
200576
*X4
Battery Connections
Con 4A*
Battery Connections
Batt. Symmetry 1
Batt. Symmetry 2
Batt. Symmetry 3
Batt. Symmetry 4
Temperature Sense 1
Not Connected
Not Connected
SERIAL
S1
DIFF
*Con 6
Temp sense
See Std. Documentation
356804.10x
1: Optional 9 pin D-sub RS232 connection.
Can be mounted in front or on rear side of
Smartpack. Replaces "Ext. Battery Connections"
when mounted on the rear side of Smartpack
2: Optional Web/SNMP (ENET) connection.
Replaces "Ext. Alarm I/O Connections"
* To be labeled
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2007-01-03
SHWINO
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Alteration
Date/Sign
Date
31 oct. 2006
Design
ORSKNO
Draw
ORSKNO
Approved
HAHANO
Scale
Projection
Block Diagram Minipack 48Vdc
4,8kW
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